

## Four New Species of New Zealand Land Snails and the systematic position of *Gerontia cordelia* Hutton.

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### FAMILY FLAMMULINIDAE

Genus *ALLODISCUS* Pilsbry, 1892.

Two new species of the group of *Allodiscus dimorphus* are described below. Each occurs in an area presumed to have been separated formerly from the mainland. A third species, *cooperi* Suter, is related to *fallax*, one of the new species, and is known only from the Poor Knights Islands. The fourth member of the group, *dimorphus* Pfeiffer, is widespread over most of the North Island.

The following key provides easy identification of the four species of the group.

- A. Spirals absent or microscopic:
  - a. Radials on penultimate 45-48 .. .. *dimorphus* (Pfeiffer)
  - b. Radials on penultimate 75-80 .. .. *fallax* n. sp.
  - c. Radials on penultimate 89-90 .. .. *cooperi* (Suter)
- B. Spirals strong, fenestrating radials:
  - d. Radials on penultimate 100-104 .. .. *spiritus* n. sp.

#### *Allodiscus fallax* n. sp. Text fig. 2.

Shell of similar size and shape to *dimorphus* (Text fig. 1) but with a darker and more clear-cut tessellated pattern, as well as more numerous axials, 75 to 80 on the penultimate, compared with 45 to 48 in *dimorphus*. Interstices of radials with 8 to 10 secondary radial threads compared with 10-12 in *dimorphus*. Very dense and extremely fine spiral threads, only on the latter part of the protoconch, the first post-nuclear whorl and around the closed umbilicus. Whorls 5, including a depressed protoconch of almost two whorls, faintly malleated, with occasional axial growth lines and exceedingly fine dense spirals over the second whorl.

Diameter, 7.25 mm.; height, 4.75 mm. holotype).

*Locality*: Oruru Bay near Knuckle Point, Rangiawhia Peninsula, Northland, under leaf mould in stunted coastal scrub on steep cliff face near head of bay, 29/1/1950.

The Rangiawhia Peninsula, tied to the mainland by low country and extensive dunes, was probably formerly an island. The species *dimorphus* has not been found in the area.

**Allodiscus spiritus** n. sp. Text fig. 3.

Shell almost as large as *dimorphus*, a similar but darker and more clear-cut tessellated pattern, more than twice as many radials, 100-104 on the penultimate and dense distinct spiral threads over all whorls, forming a regular interstitial reticulation with the secondary radials, which number 8 to 10 for each interspace. Whorls  $5\frac{1}{4}$ , including a depressed protoconch of  $1\frac{3}{4}$  whorls, sculptured as in *fallax* but with the spirals more distinct. The adult whorls are more rounded and not so deep as in *dimorphus*. Imperforate.

Diameter, 7.0 mm.; height, 4.5 mm. (holotype).

*Localities*: Waterfall Gully, Kapo Wairua, Spirits Bay, in *Astelia*, Jan., 1950 (holotype); Unuwahao, 750-900 feet east of Spirits Bay, in *Astelia* and under decaying leaves.

The Cape Maria van Diemen-North Cape Block has a distinctive land snail fauna obviously developed during former separation of the area from the Northland Peninsula. The species *dimorphus* is unknown from this area also.

*Dentition*: 32 + 1 + 32. Radula similar to that of *dimorphus*, Central tooth with the base longer than broad, narrower in front and with a single prominent, long cusp with a minute denticle on either side. Laterals similar to the central tooth but with a distinct denticle on the outer side only. Marginals at first longer than broad but broader than long towards the extremities, with bidentate cusps and 3 to 6 denticles on the outer side.

Genus **THALASSOHELIX** Pilsbry, 1892.**Thalassohelix prousei** n. sp. Text figs. 4, 5, 6, 8 and 9.

Shell similar to that of *zelandiae* but peripheral carina almost obsolete, spiral sculpture much stronger and axial growth lines weaker, a wider umbilicus and a characteristic light zone surrounding the umbilical area, the epidermis being here much thinner, allowing the white shell to show through. Whorls 5, including a low rounded protoconch of  $1\frac{3}{4}$  whorls, bearing subobsolete microscopic spirals over the last half whorl. Post-nuclear whorls intricately sculptured with dense distinct spiral threads crossed by numerous somewhat irregular weak axial growth lines and a very dense surface pattern of minute wrinkle-striae. There are about twenty spirals on the penultimate. Umbilicus open and deep, one-seventh major diameter. Spire more than half height of aperture. Colour of epidermis pale horny.

Diameter, 5.5 mm.; height, 4.75 mm.

*Locality*: Paturau River, in small patch of bush on the property of Mr. H. S. Prouse.

*Dentition*: (14 + 9) + 1 + (9 + 14) (Text figs. 8 and 9). Central tooth with a narrow rectangular base and a relatively short stout mesocone, ectocones obsolete. Laterals with the addition of a short stout ectocone. Marginals long, oblique, awl-shaped without ectocones or denticles.

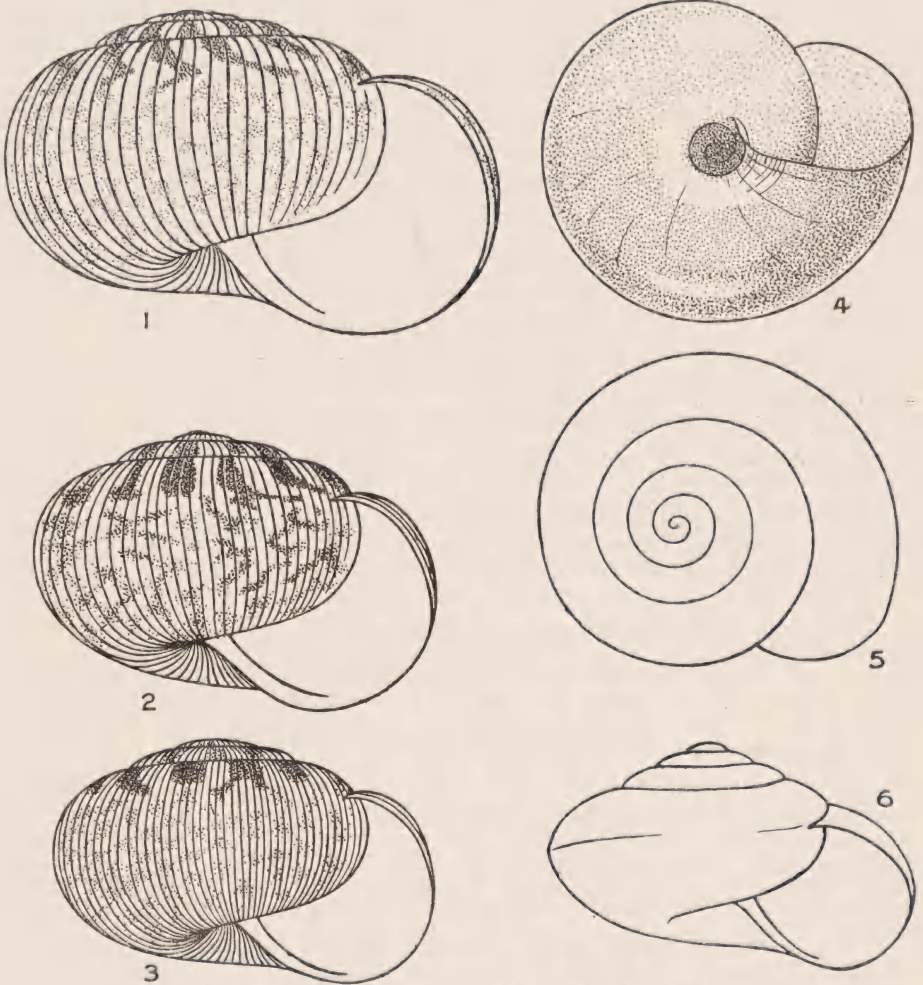


Fig. 1. *Allodiscus dimorphus* (Pfeiffer), Waitakere Range.  
 Fig. 2. *Allodiscus fallax* n. sp. Holotype, 7.25 x 4.75 mm.  
 Fig. 3. *Allodiscus spiritus* n. sp. Holotype, 7 x 4.5 mm.  
 Figs. 4-6. *Thalassohelix prousei* n. sp. Holotype, 5.5 x 4.75 mm.

### FAMILY PARYPHANTIDAE

#### Genus RHYTIDA Albers, 1860.

#### *Rhytida forsythi* n. sp. Text fig. 10.

This is a miniature relative of *dunniae* with an adult size of less than half the linear dimensions attained by that species. The egg also is approximately half the size of that of *dunniae*. The peripheral carina is not so sharply keeled. The dentition resembles that of *dunniae* except for the central tooth, which is the same size as adjacent laterals, not half the size.

Whorls 4, including a low rounded smooth protoconch of  $1\frac{1}{2}$  whorls. Post-nuclear whorls sculptured, as in *dunniae*, with dense anastomosing radial wrinkles. These wrinkles are irregularly thickened at the

periphery but interrupted or spaced, not fused into a continuous ridged keel as in adult *dunniæ*. Umbilicus deep, about one-sixth diameter of the base. Colour uniformly fuscous.

*Dimensions of shell:*

<i>forsythi</i> :	diameter,	13.0 mm.;	height,	6.5 mm. (Holotype)
	"	13.5 mm.;	"	7.25 mm. (Largest seen, Herekino Gorge)
<i>dunniæ</i> :	"	30.5 mm.;	"	15.0 mm. (S. of Kaeo)
	"	30.0 mm.;	"	16.0 mm. (Pekerau)
	"	25.0 mm.;	"	12.0 mm. (Whangarei)
	"	24.0 mm.;	"	11.0 mm. (Type)
	"	23.0 mm.;	"	11.75 mm. (Cornwallis)

*Dimensions of egg:*

<i>forsythi</i> :	length,	2.6 mm.;	width,	2.15 mm.
<i>dunniæ</i> :	"	3.5 mm.;	"	2.75 mm. (Cornwallis)
	"	4.5 mm.;	"	3.75 mm. (Kaeo)

*Dentition:* Radula almost identical with that of *dunniæ*. Formula 17 + 1 + 17. The outer five laterals increase in size from the margin to the sixth, which is large and massive, then they diminish gradually to the centre. Central tooth as large as adjacent laterals.

*Localities:* (*forsythi*) one mile up Taipa Estuary, south side (A.W.B.P., 20/1/1950) (Holotype); Whatuwihwi, Rangiahia Peninsula, Doubtless Bay (D. G. Forsyth); Oruru Bay, near Knuckle Point, Rangiahia Peninsula (A.W.B.P., 29/1/1950); Quarry up valley north side of Taipa-Oruru Road, Mangonui County (A.W.B.P., 1/2/1950); Broadwood, Summit of Mangamuka; Owkata, Herekino Harbour; Moerewa; Okaihau and Waipoua Forest (N. Gardner).

*Localities:* (*dunniæ*) Kaitaia to Thames (fide Suter, 1913); Church Road, ca. 4 miles from Awanui-Mangonui highway; head of Pekerau Valley, ca. 2 miles S.W. of Lake Ohia; subfossil in dunes, Tokerau, Doubtless Bay; Takahui, Victoria Valley, Kaitaia; Kaeo; Whangarei; Kauri Mountain, Whangarei Heads; Parua Bay; Woodcocks; Mangawai Gorge; Kawau Island; Wade River; Cornwallis, Manukau; Centennial Drive, Waitakere Range, at Waitatarua, and near Titirangi.

The species *forsythi* has a restricted range extending from Rangiahia Peninsula and Mangonui westward across the Peninsula to Mangamuka, Herekino and Waipoua Forest. Its distributional pattern interpolates with but does not seem to overlap that of the northern extremity of the *dunniæ* range. I have never found both species at any one locality, but they do occur in an apparent haphazard proximity, especially between Mangonui and Kaitaia.

The differences in carination and dentition indicate that *forsythi* is not merely a size mutant of *dunniæ*. Otherwise it could be surmised that lack of lime or some other deficiency is responsible for the size disparity.

Reference to the N.Z. Geological Survey North Island Map, 1947, shows that *dunniæ* occurs mostly in association with sedimentary rocks of the Oligocene-Miocene formations 15-18 and *forsythi* in volcanic (No. 3) and Senonian (No. 13) areas. However, there are exceptions, notably in the Waitakere area, where *dunniæ*, not a "dwarfed form," occurs in association with a volcanic formation.

Reference to text figures (10 and 11) shows that *forsythi* is undoubtedly adult at 13 mm., for it has the characteristic sag of the outer lip near its junction with the body-whorl. Figure 11 is of an immature

*dunniae* from Pekaerau; both to same scale. The fully developed radula, complete with central tooth and marginals, and the presence of eggs also show that the species is mature.



Fig. 10. *Rhytida forsythi* n. sp. Holotype, 13 x 6.5 mm.

Fig. 11. *Rhytida dunniae* (Gray) to same scale (juvenile)

I prefer to consider *forsythi* as specifically not subspecifically distinct largely on account of its local range and curious mode of occurrence, interpolated with *dunniae* but evidently nowhere inter-breeding. The inference is that *forsythi* originated as the result of some previous isolating factor no longer apparent.

I associate the name of Mr. D. G. Forsyth with this species, since he first brought the problem to my notice.

### Genus **DELOS** Hutton, 1904

#### **DELOUAGAPIA** New Subgen.

Type: *Gerontia cordelia* Hutton

The small snail long known as *Gerontia cordelia* has been considered a rarity. The type locality was cited as Titirangi, but to my knowledge it has not since been collected from the vicinity of Auckland. I know of it, however, from a number of Northland localities: Maungakaramea, near Whangarei (A. E. Brookes, 1928); the northern headland block, Whangaruru Harbour (A. C. O'Connor and A.W.B.P., Feb., 1948; Oruru Bay, Rangiawhia Peninsula (A.W.B.P., Jan., 1950); Cape Maria van Diemen (mainland), Kapo Wairua, Spirits Bay and Kerr Point near North Cape (A.W.B.P., March, 1949).

At Whangaruru and at Kapo Wairua this snail was found to be arboreal, living in clumps of *Astelia*, epiphytic on the limbs of puriri (*Vitex lucens*). At Kerr Point dead shells were abundant on the ground under clumps of *Astelia* in the stunted and rather sparse herbfield. Again, at Cape Maria van Diemen, *cordelia* was associated with *Astelia*, growing on the ground, there being no tall vegetation at either locality.

It may be noted that shells labelled "*Delos jeffreysiana*, Cape Maria van Diemen," in the Suter collection are *cordelia*.

The dentition and salient features of the animal show that *cordelia* is a carnivorous Paryphantid of the genus *Delos*.

The shell is very similar to that of *Delos jeffreysiana* except for the dark reddish-brown marbled and streaked colour pattern which is more in accord with that of the Melanesian-Polynesian genus *Ouagapia*.

The type of *Ouagapia* is the New Caledonian *raynali* Gassies, a large shell measuring 33 mm. x 17 mm. Its dentition is unknown, but the several small species ascribed to the genus have more aculeate teeth than *Delos*. The formulae range from 12 + 0 + 12-13 + 0 + 13 for the Fijian *ratusukuni* Cooke, 1942, to (20-23) + 1 + (20-23) for the Caroline Islands *oualanensis* Pease, 1866.

The dental formula for both the New Zealand *Delos coresia* and *jeffreysiana* is 9 + 0 + 9 and that of *cordelia* 12 + 0 + 12. (Text fig. 7.) The teeth in all three are stout, relatively broad-based and slightly hooked. In *Delos* typical, the second tooth from the centre is largest, after which they regularly diminish. In *Delouagapia* the fourth tooth from the centre is disproportionately large, then regularly diminishing from the fifth to the twelfth.

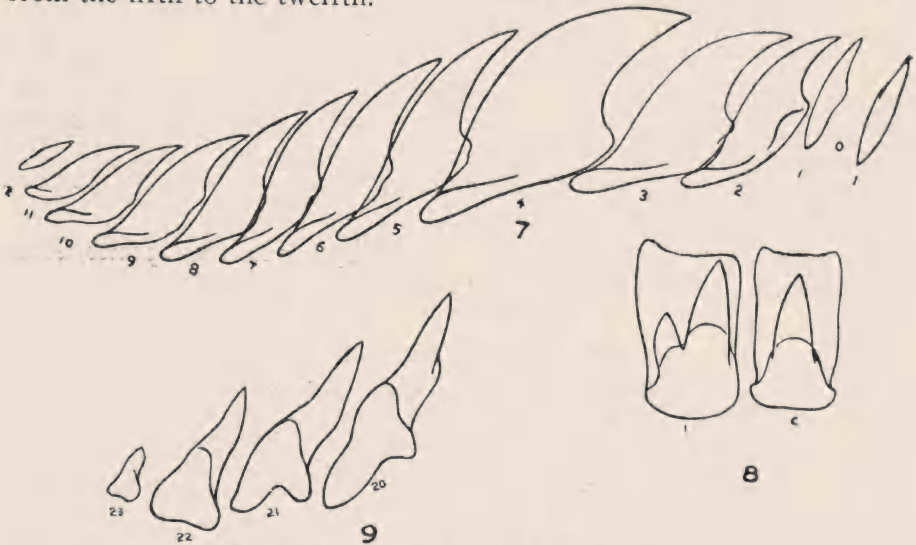


Fig. 7. *Delouagapia cordelia* (Hutton).

Figs. 8, 9. *Thalassohelix prouzei* n. sp.

The animal of *cordelia* is slate-grey except for the sole, which is white. Surface reticulate veined, scarcely warty. Two deep parallel grooves on the dorsal area run back from between the superior tentacles, which are blunt, cylindrical and moderately long. Inferior tentacles short, genital orifice on right below mantle collar, proboscis capable of protrusion, foot narrow, transversely wrinkled and with a moderately long pointed tail.

Yoshio Kondo (1943, Occas. Pap. Bernice P. Bishop Mus., vol. 17, No. 19, p. 247) found close relationship between the anatomy of *Delos* and that of the smaller Melanesian-Polynesian species ascribed to *Ouagapia*, but since the anatomy of the large-size type species, *raynali*, is unknown, admitted the possibility of ultimate subgeneric division.

Although *cordelia* conforms with *Delos* in shell features, the *Ouagapia*-like colour pattern and in particular the disproportionately large fourth lateral tooth would seem to warrant the subgeneric status proposed above for this species.

The holotypes of the four species described in this paper are in the Auckland Museum.